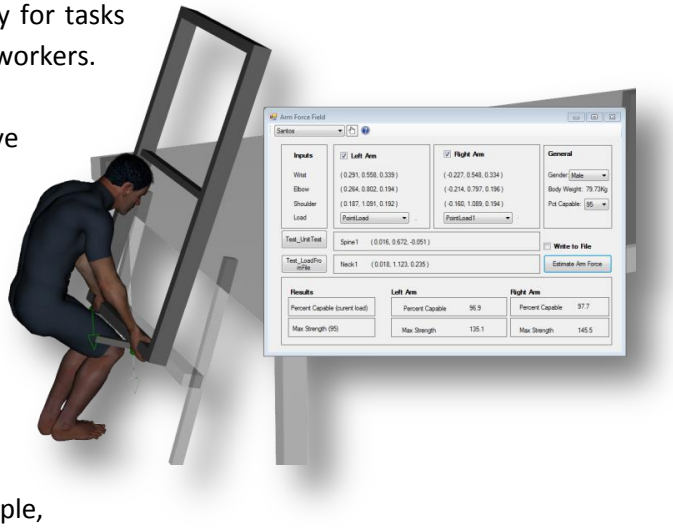
The most accurate and extensively validated method of predicting exposure to risk of injury for tasks involving manual arm strength is available now through the Santos® AFF Plug-In.

For a limited time, $960 provides a 1 year license of Santos® Lite bundled with the Santos® AFF Plug-In.

Read the Arm Force Field method paper, published in the March, 2017 edition of Applied Ergonomics, here and **read on to learn why this technology is critical for your industry.**

Estimates are that every year in the USA, 4.1 Million workers suffer a serious **job-related injury or illness costing US employers $50B – $70B per year in compensation**. In addition, the greatest cause of lost days to US warfighters is due to accidents and musculoskeletal injuries involving the use of their equipment.

Given that most tasks are performed with the hands which require the use of the shoulder, arm, and hand (referred to as the ARM here on), manual ARM strength (MAS) is relevant for most task analyses and is the limiting factor for many. In order to significantly address the injury numbers above requires the ability to accurately predict exposure to risk of injury for tasks involving MAS, preferably before assigning those tasks to workers.



While methods and tools to assess MAS exist and have been widely used for many years, the injury numbers speak for themselves. Clearly, the existing methods and tools currently being used to determine exposure to risk of injury for tasks involving MAS are not accurate enough.

Dr. Jim Potvin (Prof. Emer., McMasters University) questioned the validity of some of the assumptions the current methods make when determining MAS. For example, many widely used methods to determine MAS are based on the strength of individual axes of rotation at each joint of the ARM. This common approach typically represents the ARM using 3 degrees of freedom (DoF) at the shoulder, 1 DoF at the elbow, and 3 DoF at the wrist/forearm. MAS analysis using this approach seeks to identify which of the individual strengths of the ARM joint axes will limit the ability to perform a task, as if identifying the weakest link in a chain. The problem with this approach is that it assumes each of the ARM's axes has its own independent strength even though this is impossible, as many of the ARM's muscles act about multiple joint axes simultaneously.

Potvin and his colleague, Dr. Nick La Delfa (McMaster University), performed an extensive study that not only confirmed their concerns but also revealed that the **RMS errors associated with the current, widely used methods are greater than 16 lbs**. (*Reference, "Hall et al 2016", Hall, A.D, La Delfa, N.J, Potvin, J.R. Ergonomics software packages do not accurately estimate manual arm strength for ergonomics assessments. Canadian Society of Biomechanics Conference, Hamilton, ON, July 2016.*) This means that existing, widely used methods can cause workers to be exposed to significant increases in risk of injury, or may result in a task, which could easily be done without significant exposure to risk of injury, unnecessarily and very expensively redesigned.

Potvin also thought that, since engineers and designers really only need to know the maximum acceptable MAS, identifying the limiting joint axis strength of the ARM (as current MAS assessment methods do), is not only inaccurate, it is irrelevant.

With all of this in mind, Potvin decided that it would be better to measure MAS directly at the hand and come up with a method that could accurately predict task strength requirements based only on the hand location and the force direction.

Based on over 12 years of research, the Arm Force Field method is **ONLY available through the Santos® AFF Plug-In** and includes:

- Empirical data from 95 healthy, female participants for 36 hand locations and up to 26 force directions where the total n is 536 conditions, 13,660 trials, and approximately 25 subjects per trial.
- An artificial neural network, which has been extensively validated and shown to be extremely accurate at estimating MAS across a wide variety of conditions, providing an RMS error of only 1.4 lbs. (compared to the 16+ lbs. for the current, widely used methods).

Links:

Learn more about Santos® Lite and the Santos® AFF Plug-In		Take advantage of a limited time offer to obtain the Santos® Lite / Santos® AFF Plug-In Bundle for the equivalent of $80 per month.
Contact sales@santoshumaninc.com to purchase multiple copies of the Santos® Lite / Santos® AFF Plug-In Bundle		Learn more about the Santos® Institute and its programs including, Training, Support, Mini-Courses, and the Santos® University Program.

Attention Universities in the USA:

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SHI's success is tied directly to our clients' success and the Santos® Lite / Santos® AFF Plug-In bundle represents yet another way in which we strive to match our state of the art, human-centric, virtual product design and analysis methods, technologies, and resources with client requirements.